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Mild Hemolytic Disease of the Newborn Due to Anti-C^w†

MARY K. CURTIN, B.S., M.T. (ASCP)
Technical Supervisor, Blood Bank
Milwaukee County General Hospital
Milwaukee, Wisconsin

GERALD F. McKAY, M.D.°
Clinical Pathologist, Milwaukee County General Hospital
Assistant Professor of Pathology
Marquette University School of Medicine
Milwaukee, Wisconsin

BYRON A. MYHRE, M.D., PH.D.°°
Pathologist and Director of Blood Bank
Milwaukee County General Hospital
Assistant Professor of Pathology
Marquette University School of Medicine
Milwaukee, Wisconsin

ABSTRACT

A case of mild hemolytic disease of the newborn caused by anti-C^w is reported. This report demonstrates the advisability of including routine direct antiglobulin (Coombs) tests on all cord blood specimens. A recommendation is made that maternal sera be tested against the father's cells at least once during each pregnancy. An attempt to determine the frequency of the C^w gene in the American Negro population is reported.

INTRODUCTION

Anti-C^w was originally described in 1946 by Callander and Race[1] as one of several antibodies found in the serum of a recipient of multiple blood transfusions. This antibody, they reported, exhibited dosage effect, that is, it reacted stronger with homozygous C^w cells than with heterozygous cells. It also reacted better at 37°C than at room temperature and caused a hemolytic transfusion reaction. They theorized that the C^w gene belonged to the Rh system, was an allele of C and c, and was detected by a separate antiserum, as opposed to the dosage reactions characteristic of D^u.

In 1954 Chown and Lewis[2] reported an example of anti-C^w as a naturally occurring antibody. This report was followed by two similar examples of naturally occurring anti-C^w described by Kornstad, *et al.*[4] in 1960. These antibodies showed a wide thermal amplitude, reacting well from 4° C to 37°C. They did not react by the indirect antiglobulin (Coombs) technique.

Anti-C^w has also been responsible for rare cases of hemolytic disease of the newborn as reported by Lawler[5] in 1947, van Loghem[6] in 1953, and Geiger[3] in 1959.

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° Deceased

°° Present address: Scientific Director, Los Angeles and Orange County Red Cross Blood Center, Los Angeles, California.

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This report concerns a case of mild hemolytic disease of the newborn having several interesting aspects.

CASE HISTORY

Mrs. Q.W., a 36-year-old Negress, para 9, gravida 12, was admitted to the obstetrical department of Milwaukee County General Hospital in August, 1964. She delivered a full-term well-developed, male infant. Our attention was attracted when a routine direct antiglobulin test (done on cord blood specimens of all newborn infants) was strongly positive (4+). Other cord blood findings were: hemoglobin 19.7 g/100 ml, hematocrit 62%, reticulocyte count 4.8%, and bilirubin 0.8 mg/100 ml. Initial blood grouping and typing showed the baby to be group A, Rh_0 (D) positive.

Mrs. Q.W.'s blood proved to be A_1, Rh_0 (cDe), N. She denied a history of blood transfusions. Preliminary screening of her serum against a commercial preparation of Reagent Red Blood Cells (Human) gave negative results by saline, high-protein, and indirect Coombs tests.

Since there was as yet no explanation for the infant's positive direct Coombs test the father's blood was studied. He was found to be group O, $Rh^w{}_1$ (C^wDe), Ms, P_1, U, V–, Kk, Kp (a–b+), Js (a–b+), Fy (a+b+), Lu (a–b+), and Le (a–b–). His red blood cells were strongly agglutinated by his wife's serum using saline, high-protein, indirect Coombs, and enzyme tests.

Antibody identification studies were performed on Mrs. Q.W.'s serum and showed a strongly reactive anti-C^w. Further typing of the infant proved him to be C^w positive. Antibody titers against Mrs. Q.W.'s husband's cell are shown in Table I. It can be noted that this antibody reacted best using the indirect Coombs test. Family studies are shown in Figure 1. An apparent discrepancy can be noted in one sibling (J.W.) in the MN typing. The mother typed as an N, the father as an M, and this sib as an N.

TABLE I

Mrs. Q.W.'s Serum vs. Husband's Cells

Indirect Coombs	1:32
Trypsin	1: 8
Papain	1: 8
Albumin	1:16

The infant's serum bilirubin on his second day of life was 1.2 mg/100 ml. He suffered no ill effects and was discharged on the fourth day.

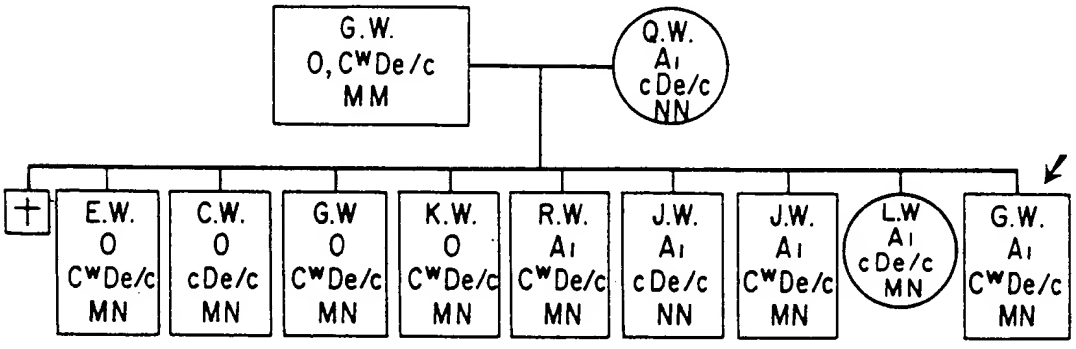

Figure 1. The W. family.

DISCUSSION

According to Race and Sanger[9] the C^{w} gene is of very low frequency, Rh$^{w}{}_{1}$ (C^{w}De) comprising 0.0129% of the English population. The highest incidence of the antigen has been found in Latvians, Lapps, and Finns (7 to 9%). No figures are available for the American Negro population. Because of this a study was undertaken to determine the frequency of this antigen in the Milwaukee Negro population. Only one example of C^{w} has been found in studying 1000 specimens.

This case of mild hemolytic disease of the newborn is significant, we feel, for several reasons. First, it illustrates the importance of routine testing of all cord blood specimens using the direct antiglobulin technique. This is in accordance with the studies of Marcuse and Francis[7] who studied 2000 consecutive newborns and found 128 cases of hemolytic disease due to antibodies other than anti-Rh$_{0}$ (D). They concluded the chief advantage of routine direct Coombs tests on cord blood specimens lies in the anticipation of potential hemolytic disease and recognition of its mechanism.

Second, this case indicates the necessity of screening all obstetrical patients (including those who are Rh positive) for the presence of irregular antibodies which may cause hemolytic disease in the infant. Pirofsky[8] stresses the advantages of thorough prenatal testing of maternal serum using group O erythrocytes containing all clinically significant antigens. Since the antiglobulin test alone may fail to detect some antibodies, he suggests the use of enzymes as an additional procedure. He predicts a progressively increasing incidence of erythroblastosis fetalis due to antibodies other than anti-Rh$_{0}$ (D), making routine antenatal screening necessary.

Third, the case stresses the advantage of testing mother's serum against the father's erythrocytes, if group compatible, sometime during the prenatal period. Hemolytic disease of the infant can result only from antibodies against the father's cells. Commercial cells, of necessity, often fail to include rare antigens.

SUMMARY

A case of mild hemolytic disease of the newborn caused by anti-C^{w} is reported. This report demonstrates the advisability of including routine direct antiglobulin (Coombs) tests on all cord blood specimens, and of testing maternal sera against the father's cells at least once during each pregnancy. In addition, results of an attempt to determine the frequency of the C^{w} gene in the Milwaukee Negro population are reported.

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A completely redesigned and refurbished "flexible-size" booth display has just been completed and immediately went to work representing the Nebraska ASMT in their big Lincoln Health Centennial Fair. The new display features a flasher top panel; rotating "tri-vision" center-unit, and was designed to tell the ASMT story on changeable copy panels. As a part of the new national public relations program this display is available to any member branch of the ASMT for use in local exhibits or shows; and, the unit will be shipped to the local group on a prepaid basis through a request to the Executive Director's office.

Due to the display's unique modular design, it is entirely "flexible" in size and can be used in display space ranging from an area as small as 2 feet wide to a full trade-show booth space of 12 feet. To allow this flexibility, the entire display is composed of five individual units (panels) which are 2 feet wide and can be used individually, or side by side to make a total unit. It is lighted at the top on each panel and includes a rotating tri-vision panel in the center. Individual panels supply facts on Medical Technologists ranging from their educational requirements to professional activities and "specialized messages" pertinent to local trade-shows, exhibits and conventions can be easily prepared for use on certain panels.

The localized identification panels can be ordered through the Executive Office at the same time request is made for use of the display. Message (copy) should be supplied at this time and will be prepared by the PR department and shipped with instructions for mounting on display panel when unit is assembled.